

moved southeastward into eastern Texas while an extensive area of high barometer prevailed over the Lake region. This depression moved slowly eastward, and at 4:35 p. m. of the 30th, a subsidiary centre was apparent in southern Georgia, while the main depression was over Tennessee. This subsidiary centre rapidly grew in importance, as is usual, on the east slope of both the Appalachian and the Rocky Mountain chains. At 7:35 a. m. of the 31st, it was in eastern North Carolina, while the original centre seemed to still remain in Tennessee. During the rest of the 31st the original centre disappeared, and the new one on the coast of North Carolina was attended by increasing winds, which, among other disasters, wrecked the steamer *Metropolis*. The northeast gale of the 31st caused very high tides on the Middle Atlantic coast, from some points of which the following reports have been received: Coney Island and Rockaway, Long Island, tide 20 feet high, wooden buildings swept away. Greenport, Long Island, violent gale and very high tide, much damage to shipping. At Plumb Island, Long Island Sound, the schooner "Ella Haynes" was wrecked. Long Branch, N. J., many houses damaged and portions of the N. J. Central R. R., washed away. Near Boston, Mass.; the average snow-fall was 18 inches, with drifts of 10 feet deep. The monthly journal just received from Cape Lookout while this Review was about going to press shows that during the 31st the barometer remained vibrating between 29.45 and 29.49 during the whole day, from 7 a. m. to 4 p. m., while the hurricane moderated in severity from its extreme velocity of 120 miles per hour at 2:20 a. m.; and veered from ESE. to S. and SW., with a tremendous sea.

The following order, issued to the Signal offices in principal cities, explains itself:

WASHINGTON, D. C., February 5, 1878.—SERGEANT: By direction of the Chief Signal Officer, the Signal Service station at the wreck of the *Metropolis* will be called in at noon to-morrow, (Wednesday, February 6, 1878), the men on duty rejoining their proper stations at Kittyhawk and Cape Henry. This station was established as follows: A mounted messenger from near the wreck of the *Metropolis*, leaving there about noon, reached Kittyhawk signal station, distant about twenty miles, at 6:55 p. m., January 31. The Corporal in charge, mounting his assistant, Private William Davis, on the messenger's horse, ordered him, fully equipped, to the wreck, at the same time reporting wreck and facts to this office. The facts were at once communicated to the Life-saving Service and Naval authorities, the wrecking companies, Seaman's Aid Association and others at Norfolk and to the higher authorities at Washington. Active measures and assistance were taken at both cities. Private Davis leaving Kittyhawk within fifteen minutes after the arrival of the messenger, for going on horseback twenty miles to one of the worst sea beaches of the coast, in a dark night, through a storm, reached the wreck at 3:20 a. m., forwarded a report to the office at 4 a. m., and, at 5 a. m., sent a condensed report of the facts. By noon a more complete statement, giving also names of saved known up to that hour, had been received and furnished to the press, with many other telegrams. From the time at which Private Davis reached the wreck he remained steadily at his station on the open beach, without shelter, until 9 o'clock p. m. of Friday, at duty of twenty-six hours without rest, and in which twenty miles had been ridden on horseback. On Friday night assistance, with extra instruments, etc., which had been ordered from Cape Henry, reached the wreck-station. Cape Henry station being in turn reinforced from Norfolk, all of these stations, as well as Kittyhawk, were open all night the night of the wreck, the ensuing day, and until all the survivors had left the wreck on Friday night. It was by the agency of these stations that all telegraphic information, which appeared in the journals throughout the country, reached the press, and that by which the action of the authorities was guided. The station has since been maintained to aid the friends of the lost and others interested. The highest wind velocity of the *Metropolis* storm was, at Cape Henry, sixty miles; at Kittyhawk, thirty-nine miles; and, at Cape Hatteras, fifty miles per hour. The Cautionary Signal had been displayed at Cape May thirteen hours in advance, and at Norfolk nineteen and a half hours in advance before the wind attained a velocity of twenty-five miles per hour.

(Signed)

C. E. KILBOURNE,

First Lieutenant Second Artillery, Acting Signal Officer and Assistant.

The Chief Signal Officer thereupon issued the following commendatory order:

The Chief Signal Officer commends the prompt and zealous action, during the "Metropolis storm," of the non-commissioned officers in charge, and their assistants, at the stations Kittyhawk, Norfolk, Cape Henry and Cape Hatteras, of Privates T. B. Harrison and F. E. Seegelken, sent respectively to reinforce Cape Henry and the Metropolis wreck station, and especially of Corporal A. T. Sherwood, who notified this office the instant the report was received by messenger from the wreck at 6:50 p. m., January 31, and Private William Davis, Signal Service, U. S. A., who, under immediate direction of Corporal Sherwood, starting on horseback, fully equipped, within fifteen minutes after the receipt of the notice of the wreck at Kittyhawk station, rode through the night and storm twenty miles to the scene, by 3:20 a. m., opened Station on the Signal Service sea coast telegraph line, and reported for service at the wreck, sending a condensed report at 4 a. m., and there remained continuously on duty on the open beach, keeping constant telegraphic communication along the line and with this office, acting thus with faithful accuracy and intelligence for an uninterrupted tour of duty of twenty-six hours. By this action of the soldiers and stations named, all telegraphic information from the wreck which reached the superior authorities or appeared in the press, and on which steps for relief were taken, was secured.

For prompt and soldierly action, fidelity and good service, Private William Davis is promoted to be Corporal, Signal Service, U. S. A., to date from January 31, 1878.

INTERNATIONAL METEOROLOGY.

Storms at Sea.—SEPT. 27th, 1877, Old Providence Island, Caribbean Sea, very destructive hurricane. Nov. 24th, U. S. Naval Hospital, Yokohama, reports gale at that place; barometer, 29.39; rain-fall, 1.63 in. 30th, lat. 19° N., long. 130° E., heavy NE. gale. DEC. 3rd, lat. 24° 41' N., long. 66° 42' W., heavy WSW. gale, lasting 20 hours. 6th, lat. 36° N., 61° W., Brig Florence May reports "very heavy sea, sweeping everything." 10th, lat. 36° N., long. 71° 35' W., hurricane, lasting several hours. 17th, off Oahu, Sandwich Islands, heavy N. gales. 18th, lat. 30° S., long. 32° W., severe squalls from NNW. and SE., in which the Brig Flora lost sails, &c.; Honolulu, Sandwich Islands, severe and destructive storm of 3 days duration. 20th, terrific gale off the coast of Portugal. 22nd and 23rd, off northern coast of Hayti, heavy

gale and seas. 28th, midnight, Florida Reefs, SE. cyclone. 29th, lat. 35° 10' N., long. 74° 50' W., NE. to SW. hurricane, lasting 15 hours; 60 miles S. of Cape Hatteras, NE. hurricane, lasting 10 hours. 31st, Murray's Anchorage, Bermuda, violent NE. gale; lat. 38° 19' N., long. 69° 23' W., heavy NW. gale. JAN. 1st, 1878, lat. 41° 56' N., long. 65° 15' W. and lat. 39° N., long. 40° W., severe SSE. and S. gales. 2nd, lat. 47° 25' N., long. 47° 15' W., strong SW. gale; Straits of Gibraltar, heavy E. gale. 3rd, lat. 45° 53' N., long. 59° 20' W., heavy NW. gale working round to NE. 4th, lat. 42° 05' N., long. 62° 08' W., strong N. gale; lat. 50° 58' N., 40° 39' W., hard NW. gale, lasting 3 hours; lat. 37° 25' N., 67° 20' W., revolving hurricane from NE. to SW.; lat. 37° N., long. 73° W., SE. to NW. hurricane, lasting several hours. 5th, lat. 40° 44' N., long. 68° 28' W., strong S. to W. gale; lat. 31° 17' N., 76° 45' W., heavy WSW. gale; Bermuda Islands, 7 p. m., severe whirlwind, accompanied by torrents of rain; roofs of several houses in Hamilton much injured. 8th, lat. 28° N., long. 72° W., severe W. and NW. gale; off Sable Island, N. gale, lasting several hours. 9th, lat. 47° 36' N., long. 44° 28' W., heavy N. gale; lat. 31° 50' N., long. 74° 54' W., heavy ESE. gale, barometer 29.60; terrific gale off E. coast of Florida. 10th, lat. 37° 44' N., long. 73° 20' W., noon, ENE. gale, by 3:30 p. m., NW. hurricane, barometer 29.15; lat. 38° N., long. 70° W., SE. to N. hurricane, lasting 6 hours; lat. 33° 30' N., long. 75° 10' W., SE. gale, lasting 12 hours, then SW. to NW., terrific hurricane, barometer 29.30; lat. 37° 20' N., long. 74° W., heavy ESE. to N. gale, "hove to 4 hours under bare poles;" lat. 35° 20' N., long. 71° W., hurricane from S. to N., lasting 4 hours; lat. 34° 03' N., long. 75° W., 2 a. m., WSW. almost hurricane, barometer 29.40. 11th, lat. 41° N., long. 67° 20' W., SE. to SW. gale; lat. 34° N., long. 69° W., heavy SE. to SW. gale, lasting 3 days. 12th, lat. 41° 52' N., long. 63° 42' W., strong NW. gale; lat. 33° 22' N., long. 72° 12' W., heavy SE. gale, 14 hours; lat. 35° 47' N., long. 71° 30' W., heavy SE. and SW. gale. 13th, lat. 40° 38' N., long. 68° 52' W., strong WNW. gale. 14th, lat. 55° 05' N., long. 15° 51' W., heavy W. gale. 16th, Fortune Island, Bahamas, severe N. and NNW. gale, lasting from 16th to 19th; lat. 33° 57' N., long. 61° 36' W., tremendous NW. hurricane. 18th, lat. 48° 15' N., long. 43° 40' W., strong W. gale, hard squalls with hail; lat. 49° 59' N., long. 41° 28' W., hard W. gale. 19th, lat. 45° 27' N., long. 47° 37' W., and lat. 48° 12' N., long. 44° 15' W., WNW. gales. 20th, lat. 46° 07' N., long. 50° 15' W., strong NW. winds, with hard hail squalls. 22d, lat. 51° 01' N., long. 19° 59' W., strong WNW. gale. 23rd, lat. 40° 09' N., long. 70° 42' W., heavy NW. gale, barometer 30.65, terrific sea; lat. 50° 48' N., long. 21° 47' W., strong WNW. gale. 24th, lat. 40° 06' N., long. 72° 19' W., heavy NW. gale, with snow; lat. 40° 35' N., long. 72° 33' W., hard W. to WSW. gale. 25th, lat. 41° 31' N., long. 65° 34' W., heavy WNW. gale and snow. 31st, lat. 40° 20' N., long. 72° 40' W., furious E. gale, with heavy snow, lasting 12 hours; lat. 40° N., long. 64° W., heavy NE. gale, with heavy snow, lasting 24 hours.

TEMPERATURE OF THE AIR.

In General.—The general distribution of the temperature of the air is shown by the isotherms on chart No. II. The table of comparative temperatures, in the left-hand corner of same chart, shows the temperature of the month to have been unusually high in the upper Mississippi and upper Missouri valleys and Minnesota, considerably above normal in the lower Missouri valley and Lake region, and about normal along the Atlantic, Gulf and Pacific coasts.

Monthly mean temperatures at special points have been as follows: Bismarck, 17°.5; Breckenridge, 14°.7; Pembina, 11°.2; Mt. Washington, 5°.7; Pike's Peak, 1°.4.

Maximum and minimum temperatures.—*Maximum* temperatures, at Signal Service and volunteer stations, above 70° are reported as follows: 88° at Key West; 82° at Houston, Fla.; 77° at Brownsville; 76° at Castroville, Brackettsville and Eagle Pass; 75° at Baton Rouge Barracks, La., and San Antonio; 74° at Jacksonville, Savannah and Fort Concho, Tex.

Minimum temperatures, at Signal Service and volunteer stations, were —20° at Strafford, Vt.; —21° at Breckenridge; —22° at Sidney Barracks; —23° at Plattsburgh, N. Y., and Neilsville, Wis.; —24° at Fort Garland, Cal.; —25° at Fort Pembina, Dak., and Lunenburg, Vt.; —26° at Pembina, Dak. and Madison Barracks, N. Y.; —27° at Mechanic's Falls, Me.; —28° at Newport, Vt.; —29° at West Waterville, Me.; —30° at Dumbarton and Auburn, N. H.; —32° at Fort Sanders, Wyo. Ter.; —34° at Fort Fred Steele, Wyo. Ter., —35° at Mt. Washington; —36° at Orono, Me.; —38° at Woodstock, Vt.

Ranges of Temperature—Large monthly and diurnal ranges have been respectively as follows: Visalia, monthly, 45°, daily, 25°; Cheyenne, 67° and 50°; North Platte, 63° and 41°; Fort Griffin, 58 and 44°; Fort McKavitt, 61° and 52°; San Antonio, 52°, 33°; Pembina, 65°, 32°; La Crosse, 53°, 34°; Milwaukee, 58°, 27°; Cleveland, 51°, 32°; Pittsburgh, 58°, 33°; Vicksburg, 47°, 24°; Savannah, 48°, 27°; Washington, 60°, 28°; Burlington and Mt. Washington, 68° and 44°; Winnemucca, 62° and 43°.

Small monthly and diurnal ranges have been as follows: San Francisco, 23° and 12°; Pikes Peak, 35° and 27°; Leavenworth and Denison, 50° and 24°; Galveston, 35° and 22°; Davenport and St. Louis, 49°